SHOWGROUND ROAD UPGRADE: CARRINGTON ROAD TO OLD NORTHERN ROAD, CASTLE HILL

Submissions Report

SEPTEMBER 2014

Roads and Maritime Services 14.422
ISBN 978-1-925217-93-3

Executive summary

Roads and Maritime Services proposes to upgrade about 1.5 kilometres of Showground Road, between Carrington Road and Old Northern Road, Castle Hill (referred to as 'the proposal' for the purposes of this report).

Showground Road runs between Old Northern Road and Windsor Road. It is generally a four-lane road between Old Northern Road and Pennant Street, and between Carrington Road and Windsor Road. The section between Pennant Street and Carrington Road is generally one lane (in each direction) and is congested in peak periods.

Showground Road is one of the main access roads to the Castle Hill town centre, which includes the Castle Towers Shopping Centre (Castle Towers). The proposed road upgrade is needed to address the existing congestion experienced by motorists, especially during peak times and Saturdays. It is also needed in response to the projected growth in local and regional traffic, as well as the additional traffic generated by development in the Castle Hill centre, which includes the expansion of Castle Towers by Queensland Investment Corporation (QIC). The proposal is needed to satisfy condition number 34 of Development Consent 297/2008/HB for the expansion of Castle Towers. It is also the subject of a Voluntary Planning Agreement executed on 12 September 2013 by QIC, Roads and Maritime, and The Hills Shire Council.

A Review of Environmental Factors (REF) was prepared for the proposal and placed on public display from 26 March 2014 until 2 May 2014 at two locations (The Hills Shire Council office and Castle Hill Library). The REF was also available on Roads and Maritime's project website at www.rms.nsw.gov.au/roadprojects.

Roads and Maritime received 16 submissions in response to the public display of the REF. These included submissions from 12 individuals/residents and four companies/stakeholders. None of the submissions objected to the proposal.

The main comments made included:

- Potential impacts to traffic flow
- Bus priority measures at traffic lights, changes to access for bus and bus stops
- Potential noise impacts
- Potential impacts to heritage, biodiversity and soil and water quality
- Potential for cumulative construction traffic impacts with those of the North West Rail Link
- Potential impacts to amenity and safety
- Design of certain aspects of the proposal including pedestrian and shared paths
- Request for changes to other parts of the road network
- General design queries and suggestions.

The community feedback has been considered and responses to the comments have been provided as part of this report. In some cases, additional management measures or changes to the existing management measures outlined in the REF have been made and are outlined in section 3 of this document.

In summary, the proposal as described in the REF, including refinements as documented in this submissions report, meets the proposal objectives while minimising environmental impacts and appropriately considering community concerns.

Table of contents

Table index

Figure index

1. Introduction and background

1.1 Purpose

This submissions report relates to the review of environmental factors (REF) prepared for the Showground Road upgrade project, and should be read in conjunction with that document.

The REF was placed on public display between March and May 2014 and submissions relating to the proposal and the REF were received by Roads and Maritime Services. This submissions report summarises the comments raised, provides responses to each comment (section 2) and identifies new or revised environmental management measures (section 3).

1.2 The proposal

Roads and Maritime proposes to upgrade about 1.5 kilometres of Showground Road, between Carrington Road and Old Northern Road in Castle Hill (referred to as 'the proposal' for the purposes of this report). The proposal is located about 24 kilometres north-west of the Sydney central business district. The location of the proposal is shown in Figure 1.1 and the proposal is shown in Figure 1.2.

The key features of the proposal include:

- Widening and upgrading about 1.5 kilometres of Showground Road from a two-lane partially divided carriageway to a four-lane divided carriageway, to connect with the existing four-lane section west of Carrington Road and east of Pennant Street, including:
  - Upgrading the existing carriageway and carrying out drainage and pavement strengthening work to create a four-lane divided carriageway between Carrington Road and Rowallan Avenue
  - Widening the carriageway and carrying out associated work on both sides of the existing carriageway to create a four-lane divided carriageway between Rowallan Avenue and Kentwell Avenue
  - Widening the carriageway and carrying out associated work on both sides of the existing carriageway to create a four-lane divided carriageway between Kentwell Avenue and Pennant Street.
- Modifying six intersections including Showground Road with Britannia Road, Rowallan Avenue, Cecil Avenue, Kentwell Avenue/Cheriton Avenue, Pennant Street and Barwell Avenue
- Providing bus priority measures in the eastbound direction including bus priority lanes at three intersections with Showground Road including Rowallan Avenue, Kentwell Avenue and Pennant Street
- Changing the intersection of Showground Road and Britannia Road to left-in/left-out access
- Providing new traffic lights at the intersections of Showground Road with:
  - Rowallan Avenue
  - Kentwell Avenue/Cheriton Avenue.
- Removing the pedestrian activated traffic lights at the intersection of Showground Road and Cecil Avenue

- Removing access for vehicles to Pennant Street from Barwell Avenue
- Modifying the existing traffic lights at the intersection of Showground Road and Pennant Street to accommodate additional turning lanes and bus priority measures
- Building a 2.5 metre wide shared footpath and cycleway along the northern side of Showground Road between Carrington Road and Pennant Street
- Building a 1.5 metre wide footpath along the southern side of Showground Road
- Building a median with varying width
- Adjusting property accesses to be compatible with the road widening proposal
- Relocating and/or adjust utility services that are in conflict with the road widening proposal.

1.3 REF display

Roads and Maritime prepared a REF to assess the environmental impacts of the proposed upgrade and work. The REF was exhibited between 26 March 2014 and 2 May 2014 at two locations:

- The Hills Shire Council office, 3 Columbia Court, Baulkham Hills
- Castle Hill Library, Corner Castle Street and Pennant Street, Castle Hill.

Additionally, Roads and Maritime hosted two community information sessions at Castle Hill Library on Saturday 29 March between 10.30am and 12.30pm; and on Thursday 3 April between 5pm and 7pm.

The REF was placed on the Roads and Maritime website and made available for download.

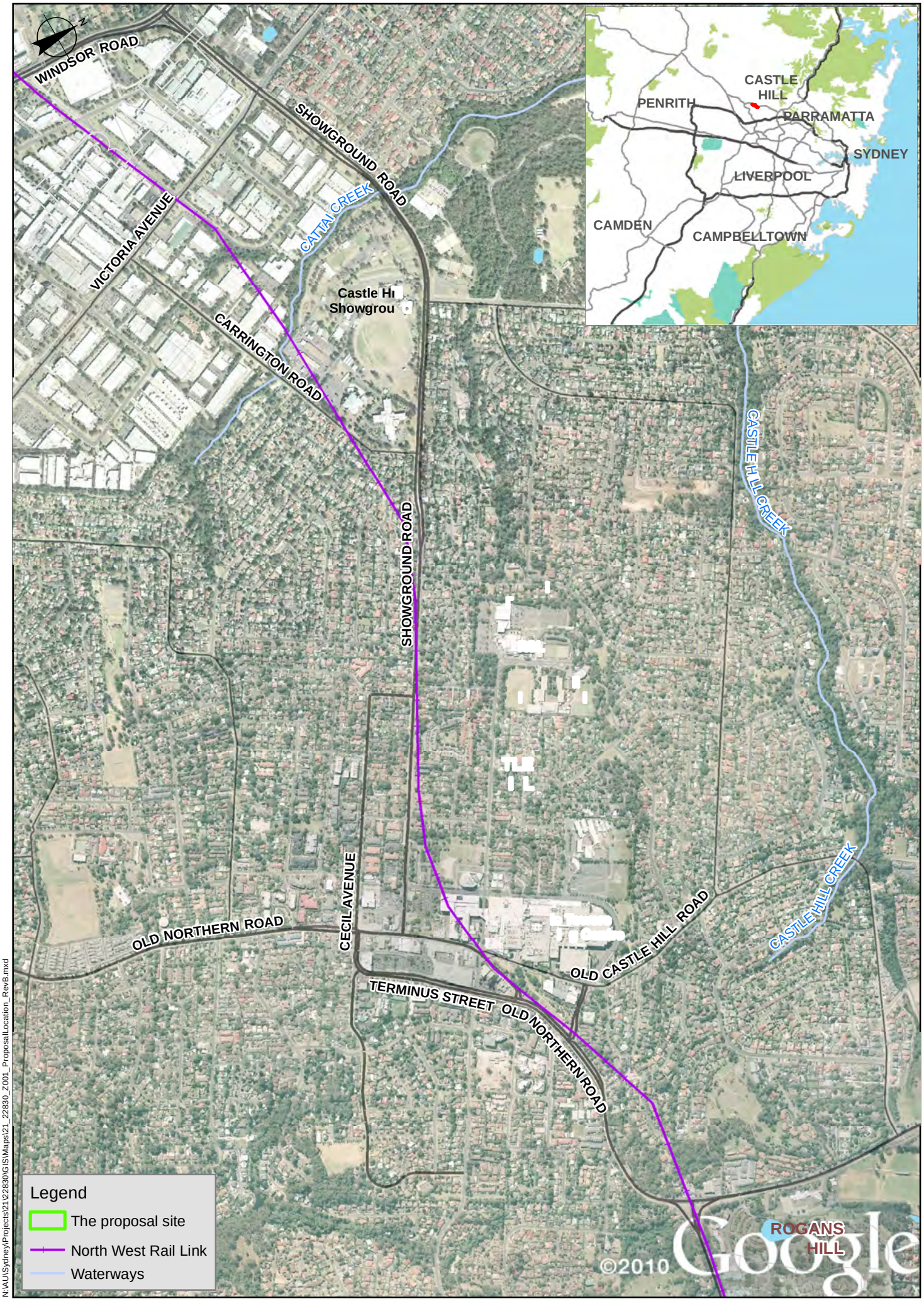

Figure 1.1
Proposal location

0 200 400 800
Metres

N:\AU\Sydney\Projects\21\22830\GIS\Maps\21_22830_Z005_TheProposal_A3_RevC.mxd

Figure 1.2
Key features of the proposal

2. Response to community feedback

Roads and Maritime received 16 submissions, accepted up until the 15 May 2014. Table 2.1 lists the respondents and each respondent's allocated submission number. The table also indicates where the points from each submission have been addressed in this report.

Table 2.1 Respondents

Respondent	Submission No.	Section number where feedback is addressed
Individual	1	Section 2.2.3
Individual	2	Section 2.3.3
Individual	3	Section 2.3.1
Individual	4	Section 2.3.3
Individual	5	Section 2.2.5, 2.3.2
Castle Hill RSL	6	Section 2.2.1
Individual	7	Section 2.3.4
Hillsbus	8	Section 2.2.1, 2.3.1, 0, 2.5.1, 2.7.1
Individual	9	Section 2.3.1, 2.3.3
Individual	10	Section 2.2.1
Individual	11	Section 2.3.1, 2.3.4, 0, 2.4.1, 2.6.2
Uniting Church	12	Section 2.2.2, 2.2.4, 2.3.3, 2.4.1, 2.6.1
North West Rail Link	13	Section 2.2.1, 2.2.3, 2.2.4, 2.2.5, 2.3.3, 2.7.1
Individual	14	Section 2.5.1
Individual	15	Section 2.3.1
Individual	16	Section 2.2.5

2.1 Overview of community feedback

Of the 16 submissions received in response to the exhibition of the environmental assessment 12 were from members of the community (mainly local residents) and four from other stakeholders including companies and organisations.

Each submission has been examined individually to understand the comments. The feedback in each submission has been extracted and collated, and Roads and Maritime has provided corresponding responses. Where similar feedback has been raised in different submissions, only one response has been provided. No submissions objected to the proposal and five submissions supported the proposal or specific elements of the proposal.

The main comments made by members of the community, including local residents, related to:

- Impacts to traffic flow and access, particularly the impact of changes to the movements as a result of the new median to prevent vehicles travelling to Pennant Street from Barwell Avenue and changes to intersection traffic flows
- Bus priority measures, changes to access for bus and bus stops
- Potential noise impacts
- Potential impacts to heritage, biodiversity and soil and water quality
- Potential impacts to amenity and safety

- Design of certain aspects of the proposal including pedestrian and shared paths
- Request for changes to other parts of the road network
- General design queries and suggestions.

The main comments raised by other stakeholders including companies and organisations were:

- Design of the bus priority measures and access for buses
- Potential for cumulative traffic impacts during construction with the North West Rail Link construction traffic
- Safe access to the Uniting Church
- Potential impacts of road traffic noise to the Church
- General design queries and suggestions.

2.2 Proposal scope and design details

2.2.1 Support for the proposal

Submission number

6, 8, 10, 13, 16

Comment summary

- General support for the proposal
- Particular support for traffic lights at the Showground Road and Rowallan Road intersection as it is considered dangerous
- Strong support for the proposal and would welcome the upgrade to be undertaken sooner rather than later, as it would be an improvement to keep up with the traffic demand
- Strongly supports the upgrade of key access roads and improvement of pedestrian and cyclist facilities
- Supports the background and need for the proposal.

Response

Roads and Maritime acknowledges the community's support for the project.

2.2.2 Consistency with Castle Towers development consent

Submission number

12

Comment summary

- The proposal is not consistent with the design that formed part of the development consent for the stage 3 works associated with the expansion of Castle Towers. Particularly concerned about access to Kentwell Avenue from Showground Road for both left and right turning vehicles to provide continued access to property.

Response

The proposal is being undertaken independent of the QIC development of Castle Towers, and therefore is subject to a separate assessment and approval process. However, condition number 34 of the development consent for the expansion of Castle Towers related to the road and traffic work required to support the development, including work to Showground Road.

Roads and Maritime has considered the design submitted by QIC for the Castle Towers development. The concept design for this proposal has evolved in consultation with key stakeholders including the Hills Shire Council and reflects the outcomes of these discussions and requirements.

The proposal includes both left and right turn access from Showground Road to Kentwell Avenue. The new four-way intersection with traffic lights at Kentwell Avenue/Cheriton Avenue with Showground Road would include:

- An eastbound left turn lane providing access to Kentwell Avenue.
- Two westbound right turn lanes providing access to Kentwell Avenue.

A full description, including a diagram, of the proposed intersection arrangement at Kentwell Avenue/Cheriton Avenue and Showground Road is provided in section 3.2.4 of the REF.

In respect of the proposal, QIC, Roads and Maritime and The Hills Shire Council entered into an agreement and executed a Voluntary Planning Agreement on 12 September 2013, which is governed by Subdivision 2 of Division 6 of Part 4 of the *Environmental Planning and Assessment Act 1979* ('the Agreement'). Clause 5(a) of the Agreement specifies that 'Roads and Maritime must carry out the upgrade to Showground Road between Pennant Street and Carrington Road to four lanes and associated intersection work including any minor modifications to council's side roads in accordance with the Agreed Concept Design.

2.2.3 Pedestrian and cyclist facilities

Submission number

1, 13

Comment summary

- Request for clarification regarding the proposed facilities for cyclists
- The shared path along the northern side of Showground Road should be extended to Old Northern Road to provide safe cyclist access to Old Northern Road, and enable cyclists to reach key destinations within the Castle Hill town centre
- Footpaths on the southern side of Showground Road should have a width of 1.8 metres to provide for improved pedestrian access, particularly for pram and wheelchair users.

Response

The proposal includes a 2.5 metre wide shared footpath and cycleway along the northern side of Showground Road, between Carrington Road and Pennant Street. The shared path is shown on the concept plans in Appendix A of the REF.

Cyclists using the shared path would be required to cross the intersections using the traffic lights. The specific sequencing of traffic lights and interaction with the cycleway would be determined as part of detailed design.

The potential for any extensions to the shared path would be considered during the detailed design phase in consultation with key stakeholders.

The concept design for the proposal provides for a width of 1.5 metres in accordance with these standards. Part 13 of the AustRoads *Guide to Traffic Engineering Practice: Pedestrians* sets a general minimum standard footpath width of 1.2 metres as adequate for most road and street situations except in commercial and shopping environments. The guide states that to enable wheelchairs to pass, a minimum width of 1.5 metres on the southern side of Showground Road is required.

2.2.4 Utility adjustments

Submission number

12, 13

Comment summary

- Two high voltage construction feeders for the North West Rail Link have recently been installed in the southern verge of Showground Road. The continued operation of these feeders is critical to tunnelling works, and any disruption must be avoided
- To facilitate safe access to the church property, the power pole located immediately west of the eastern entry to the property should be relocated further away from the driveway.

Response

Public utility adjustments and/or protection strategies, including for the 11 kilovolt underground construction feeders installed along the southern verge of Showground Road for the North West Rail Link, would be confirmed during the detailed design phase in consultation with key

stakeholders. The location of the 11 kilovolt construction feeders would be accurately located on site and shown on detailed design drawings and the work contractor would be required to maintain continuous supply of power.

Property adjustment plans, including the relocation of the power pole, would be finalised during the detailed design phase in consultation with the property owner. A road safety audit would also be undertaken during the detailed design phase to ensure standard safety requirements are met.

2.2.5 Implications for the wider road network

Submission numbers

5, 13, 16

Comment summary

- Concerned about the existing right turn and traffic light sequencing at the intersection of Pennant Street and Castle Street, as it receives a lot of traffic
- Improvement work at the intersection of Carrington Road and Showground Road should be considered as part of this project
- Concerned about the intersection of Windsor Road and Showground Road. Traffic turning right (from the two right-turn lanes) off Windsor Road into Showground Road is required to merge into one lane leading to a number of near misses. This should be addressed.

Response

Changes to the intersections of Carrington Road/Showground Road, Windsor Road/Showground Road, and Pennant Street/Castle Street are outside the scope of this project.

2.3 Traffic and access

2.3.1 Traffic lights and turning restrictions

Submission number

3, 8, 9, 11, 15

Comment summary

- Requests clarification on the number of lanes that would be available to turn right from Showground Road to Rowallan Avenue
- The proposed concrete median along Showground Road for the length of the project would restrict turning movements and access to properties, and result in increased delays and safety concerns for residents
- Concerns regarding right turn out of the driveway of properties located on the southern side of Showground Road (north-west of Rowallan Avenue)
- The concrete median would result in increased delays and longer travel distances to the Castle Hill shopping area

- The provision of a right hand turn only into Britannia Road would make a vast difference to the distance travelled to access the Castle Hill shopping centre and/or to travel north in general
- The concrete median would restrict westbound right turn movements at Britannia Road. This would increase traffic along Rowallan Avenue, Kentwell Avenue, and other back streets, and would increase queuing along Showground Road
- Concerns with the current time delay for vehicles turning left onto Showground Road from Cecil Avenue. Requested that a set of traffic lights be provided at the intersection of Cecil Avenue and Showground Road
- Britannia Road is the only road that provides direct access to Tuckwell Road. Requests traffic lights on Britannia Road.

Response

Traffic lights

Traffic modelling was carried out during the development of the concept design to identify intersections within the study area that required treatment. To improve intersection performance, traffic conditions and safety along Showground Road, new traffic lights at two intersections including Showground Road with Rowallan Avenue and with Kentwell Avenue/Cheriton Avenue were proposed, in addition to other upgrades.

The intersection with traffic lights at Rowallan Avenue would include a right turning lane in the westbound direction to provide access to Rowallan Avenue. It would also include a left turn lane in the eastbound direction to provide access to Rowallan Avenue.

A description of the proposal including intersection upgrades is provided in section 3 of the REF.

Britannia Road and Showground Road intersection

An intersection with traffic lights was not considered feasible at Britannia Road. This is because of its proximity to other existing and proposed traffic lights at Carrington Road and Rowallan Avenue. These intersections are about 380 and 320 metres respectively from the intersection of Britannia Road and Showground Road. Traffic lights at the intersection of Showground Road and Britannia Road would reduce the efficiency and traffic flow along Showground Road. Rowallan Avenue was selected for traffic lights because of its proximity to Castle Hill RSL and Castle Hill High School.

Cecil Avenue and Showground Road intersection

Traffic lights are not proposed at the intersection of Showground Road and Cecil Avenue, as traffic from Cecil Avenue could utilise the proposed traffic lights at the intersection of Showground Road and Cheriton Avenue. The traffic lights proposed at this intersection would include a signalised left-turn from Cheriton Avenue to Showground Road, which would provide for left turn movements onto Showground Road. This intersection will also provide gaps in the traffic stream, assisting vehicles turning left onto Showground Road.

Turning restrictions

Analysis of crash data for road sections within the study area was carried out as part of the traffic and transport assessment (Appendix C of the REF). The results indicated that there

were road safety issues along the corridor, with the majority of crashes occurring as a result of vehicles either queuing or stopping to turn off Showground Road.

The median would:

- Improve safety by physically separating eastbound and westbound motorists, which would reduce the potential for rear-end and head-on crashes
- Eliminate vehicles stopping to turn right into driveways
- Provide protected right and left turn facilities at intersections.

It is recognised that the introduction of the central concrete median would result in changes to existing turning movements and travel times for some vehicles. The median would prevent vehicles from turning right into and out of properties fronting Showground Road. As noted in section 6.2.2 of the REF, the main impact in terms of additional travel distances would be for vehicles travelling from properties along the southern side of Showground Road, to the west of the intersection with Rowallan Avenue. Vehicles that need to travel east from these properties would be required to travel an additional distance of up to two kilometres for some vehicles to access Rowallan Avenue from this section. Alternative access to and from these properties is shown in Figure 6.3 of the REF.

The intersection of Showground Road and Britannia Road would become a left-in and left-out only intersection. As such, vehicles that currently make a right turn out of Britannia Road at the intersection would be required to do so via Patrick Avenue and the proposed traffic lights at the intersection of Rowallan Avenue and Showground Road, as shown in Figure 6.2 of the REF. This alternative access between Britannia Road and Showground Road would result in an additional journey length of up to 780 metres.

The proposed arrangement at the Britannia Road intersection was selected to address queuing and safety concerns at the intersection. A full description of the potential impacts on access is provided in section 6.2.2 of the REF.

2.3.2 Traffic impacts on local roads

Submission number

5

Comment summary

- Concerned that there would be an increase in traffic on Kentwell Avenue as a result of the proposed removal of the right turn movement at Pennant Street. This will affect the intersection of Kentwell Avenue and Castle Street.

Response

The right turn movement out of Pennant Street to Showground Road would be retained. The proposal would include an additional right turn bay onto Pennant Street for vehicles travelling in the westbound direction along Showground Road. The left-in and left-out change proposed at the intersection of Barwell Avenue and Showground Road is required for safety as it will prevent vehicles from Barwell Avenue cutting across two through lanes to enter the right turn lanes to Pennant Street. However, the left-in and left-out modification at the intersection of Barwell Avenue and Showground Road is unlikely to result in significant impacts to traffic on Kentwell Avenue, as alternative access to the north is available via Cecil Avenue and Old Northern Road.

Any treatment required at the Kentwell Avenue and Castle Street intersection because of other developments in the vicinity, including the shopping centre expansion and new multi-deck car park (which would be accessed off Kentwell Avenue), would form part of the scope of works undertaken by QIC.

2.3.3 Pedestrian access and safety

Submission number

2, 4, 9, 12, 13

Comment summary

- Concerned about the proposed removal of the existing pedestrian crossing facility and lights at Cecil Avenue. A pedestrian crossing facility should be provided at the proposed traffic lights on the corner of Rowallan Avenue and Showground Road
- Access and safety concerns for children crossing Showground Road to reach bus stops and access school buses
- Concerned with access to the bus stop along Showground Road near Britannia Road
- Pedestrian access should be provided on all four sides of the Kentwell Avenue, Cheriton Avenue and Showground Road intersection to allow safe access to the church
- It is unclear whether pedestrian crossings would be provided on all sides of all proposed traffic lights.

Response

As shown in Figures 3.4, 3.5 and 3.6 of the REF, pedestrian crossings would be provided at all sides of the proposed traffic lights at the intersections of Showground Road and Rowallan Avenue; Kentwell/Cheriton Avenue and Pennant Street.

While the existing pedestrian crossing at the traffic lights at Cecil Avenue would be removed, the proposal involves providing pedestrian crossing at the proposed traffic lights at Rowallan Avenue, 40 metres from the existing Cecil Avenue pedestrian crossing.

There are eight bus stops located along Showground Road within the vicinity of the proposal site (refer to section 2.2.1 of the REF). Figure 6.4 in the REF shows the locations of the bus stops and the 400 metre wide walking catchment around each stop. The bus stops locations are:

- On the eastbound side of Showground Road:
  - Stop 215417 – located about 70 metres east of the Carrington Road intersection
  - Stop 215418 – located about 30 metres west of Britannia Road
  - Stop 215419 – located about 75 metres east of Rowallan Avenue
  - Stop 215420 – located about 50 metres west of Kentwell Avenue.
- On the westbound side of Showground Road:
  - Stop 215427 – located about 50 metres east of the Carrington Road intersection
  - Stop 215246 – located on the opposite side of the road to stop 215418
  - Stop 215425 – located on the opposite side of the road to stop 215419
  - Stop 215424 – located about 30 metres west of Cheriton Avenue.

Bus stop 215419 would be relocated about 50 metres to the west closer to the Rowallan Avenue intersection. Walking distances from the bus stops and properties fronting Showground Road to the pedestrian crossing at the traffic lights at Carrington Road intersection, Rowallan Avenue and Kentwell Avenue are less than 400 metres.

2.3.4 Property access

Submission number

7, 11

Comment summary

- Requests clarification regarding the potential impacts to vehicle and pedestrian access to the properties located in the vicinity of the intersection of Showground Road and Rowallan Avenue due to the proposed new traffic lights at this intersection
- Requests clarification regarding access to properties from the bus lane near the Rowallan Avenue intersection with Showground Road.

Response

Roads and Maritime will maintain driveway access for residents on Rowallan Avenue, however there would be parking restrictions in the immediate vicinity of the new lights at the intersection of Showground Road and Rowallan Avenue.

Roads and Maritime will consult with affected residents during the detailed design phase and every effort will be made to accommodate their access needs.

Properties along the northern side of Showground Road and to the west of the Rowallan Road intersection would use the left turn lane to access their driveways. It should be noted that the left turn lane on the eastbound side of Showground Road would have bus priority lanes, but it is not a dedicated bus lane (refer to section 2.3.5 of this document). Bus priority lanes are shorter lanes, usually at intersections with traffic lights. The bus priority lanes allow buses to pass traffic that is queued at the intersection. Motorists can use bus priority lanes to access an adjacent property.

2.3.5 Bus services and routes

Submission number

8, 11

Comment summary

- Requests clarification regarding bus routes and services that operate along Showground Road. These services include 26 school services operated by Hillsbus, school services operated by Busways, and out of service buses, all of which contribute to the total number of buses that use the road corridor. Noted that the traffic report should be updated to reflect this information
- The proposal would result in changes to turning movements of school buses to/from Cecil Avenue and Britannia Road. Adequate notice is requested to enable re-routing of any affected bus services

- Concerned with the assumption used in the traffic assessment that bus movements in the eastbound direction along Showground Road would continue to Old Northern Road. Buses have difficulty turning left from Showground Road to Old Northern Road and were purposely diverted away from the Old Northern Road mall section to Pennant Street during the Terminus Road and Castle Mall upgrade in 2010/11
- A full eastbound bus lane along the length of the upgrade should be provided to ensure sufficient priority for public transport
- Requests that bus priority measures be provided in the westbound direction, in addition to the proposed eastbound direction, with Public Transport Information and Priority System enabled traffic lights
- Requests clarification on the bus priority measures at Rowallan Avenue.

Response

Bus services

Traffic surveys were undertaken in 2013 as part of the traffic and transport assessment for the REF (Appendix C of the REF). These were taken during peak morning and evening periods and included records of all bus services (including school bus and out of service bus counts).

The number of bus services that was actually used in the future traffic model (based on current timetables during peak periods) was higher than the number of buses recorded during the traffic surveys. Therefore, the results of the traffic model for the future horizon year are considered to be conservative. It is acknowledged that out of service buses and school buses also operate along this route. However, this would not change the outcome of the traffic assessment.

As discussed in section 6.2.2 of the REF, the proposal would mean some changes to existing turning operations along Showground Road. This would mean some bus operations (as well as local traffic) would need to be re-routed. Meetings with bus operators and The Hills Shire Council would be undertaken during detailed design, and would include notice of required alterations to bus service routes as noted in section 5.6 of the REF.

The proposed intersection upgrade at Pennant Street would be adequate to cater for bus movements into Pennant Street or through to Old Northern Road to access the Castle Hill town centre.

Bus priority measures

The proposal complies with Sydney's Bus Future Plan by providing bus priority lanes at key intersections.

Bus priority lanes would be provided within the left turn lane in the eastbound direction at the Rowallan Avenue/Showground Road and Kentwell Avenue/Cheriton Avenue/Showground Road intersections. Buses will use the left turn lane to continue straight through the intersection in the eastbound direction, enabling them to pass traffic that is queued at the intersection.

Roads and Maritime will continue to investigate additional bus priority measures in the westbound direction at the intersection of Showground Road and Rowallan Avenue during the detailed design phase. However, a full eastbound bus lane and bus priority measures westbound at the intersection of Showground Road and Cheriton Avenue are not possible due to the width of the road corridor.

2.4 Noise and vibration

2.4.1 Noise mitigation

Submission numbers

11, 12

Comment summary

- Requests details on the proposed noise mitigation measures to be investigated for properties fronting Showground Road
- Requests details on the proposed actions to reduce the anticipated increase in road traffic noise levels.

Response

A noise and vibration assessment was undertaken for the proposal by Roads and Maritime in 2014 (Appendix D of the REF). The assessment concluded that although the proposal is not expected to increase noise levels by more than two dB(A), some residences within the study area are already exposed to 'acute' noise levels. Therefore, an assessment of feasible and reasonable noise mitigation measures for these residences would be undertaken.

As described in section 6.3 of the REF, mitigation would be required where:

- Design year noise levels are acute (that is greater than or equal to $L_{Aeq,15hr}$ 65 dB(A) day-time or $L_{Aeq,9hr}$ 60 dB(A) night-time)
- Noise levels exceed the relative increase criteria
- If the change in noise level between the 'no build' and 'build' options increases by more than two dB(A) as a result of the proposal.

Specific properties where noise mitigation would be considered are identified in Volume 2, Appendix D of the REF.

Consideration of mitigation options would be undertaken during the detailed design phase in consultation with affected landowners and The Hills Shire Council, and in accordance with the guidelines listed in section 5.6 of the noise and vibration report (Appendix D of the REF).

Mitigation options would be identified in accordance with Roads and Maritime's *Environmental Noise Management Manual Practice Note IV* (selecting and designing feasible and reasonable treatment options). The order of noise treatment priority contained in the *Road Noise Policy* (EPA, 2011) would be applied:

1. Road design and traffic management
2. Quieter pavement surfaces
3. In-corridor noise barriers
4. At-property treatments.

At-property treatment would only be considered for dwellings where other noise mitigation measures have previously been implemented or are not feasible or cost effective.

At property treatments will include:

Table 2.2 - Residential At-Property Treatment Options

Treatment	Predicted exceedance of RNP external criteria, dB(A)	At-Property Acoustic Treatment
1	<5	Fresh air mechanical ventilation.
2	6-10	Treatment 1 + replace existing weather seals with acoustic seals on windows and doors.
3	11-15	Treatment 1 + Treatment 2 + replace existing glazing with thicker laminated glazing.
4	>15	Treatment 1 + Treatment 2 + install supplementary window, fitted with acoustic seals, to inner side of existing window.

Management of road traffic noise is a major consideration in the planning and design of road projects.

Measures for treatment include road design, low noise pavement, noise walls or mounds, and at-property treatments such as mechanical ventilation and/or window glazing.

Where appropriate, Roads and Maritime installs at-property noise mitigation measures in line with the Environmental Noise Management Manual. For more information please visit http://www.rms.nsw.gov.au/about/environment/reducing-noise/index.html.

2.5 Urban design

2.5.1 Landscaping

Submission number

8, 14

Comment summary

- A clearance height of 4.5 metres should be provided for street tree plantings to allow the movement of double decker buses along the identified bus corridor
- No details are provided regarding streetscape improvements, such as removal of overhead power poles and the erection of light posts at property boundaries.

Response

The mitigation measures will be updated to reflect the clearance height of trees (refer measure 73 in Table 3.1):

'New plantings along the shared path or footpath would be selected and positioned such that

- They do not present safety hazards and reduce casual surveillance from the road and adjoining properties
- They provide for a minimum clearance height to meet Roads and Maritime standards.'

Utility adjustments proposed as part of the concept design (refer to section 3.5 of the REF) include the above ground relocation of existing overhead Endeavour Energy electricity poles within the southern shoulder of Showground Road between Carrington Road and Pennant Street to the new footpath reservation on the southern side of Showground Road.

The street lighting design would be undertaken during the detailed design phase and all lighting for the proposal would be in accordance with *Australian Standard 1158: Lighting for roads and public spaces*.

As discussed in section 3.2.9 of the REF, an urban design report and landscape character and visual impact assessment was prepared as part of the REF to inform the concept design (Appendix I of the REF) by developing objectives and principles.

The objectives and associated principles were then developed into a set of more specific recommendations for design strategies and initiatives relating to:

- Construction activity and storage
- Retention of visually important vegetation
- Tree planting opportunities along path
- Lighting and signage
- Emphasising land use and character zones
- Shared path safety.

These principles and design features, which would be considered further in the detailed design phase, have been incorporated in the mitigation measures summarised in Table 3.1 to minimise potential impacts on landscape character and visual amenity.

2.6 Land use and property

2.6.1 Individual property impacts

Submission number

12

Comment summary

- Would like to review property adjustment plans.

Response

As noted in section 5.6 of the REF, meetings would be held with affected landowners during the detailed design phase to discuss impacts to properties that may occur as a result of the proposal.

2.6.2 Impacts on property values

Submission number

11

Comment summary

- Impacts on property values as a result of changes to access arrangements.

Response

It is difficult to accurately predict the potential impact of a proposal on individual property values, as it is difficult to isolate the potential impact of the proposal from the other factors that

also influence property values (for example, the local market, interest rates, local economy, population trends, etc).

The REF considered the potential impacts on the surrounding environment during construction and operation of the proposal. No significant air quality, noise or visual impacts were predicted. As a result, the amenity of residents and visitors to the surrounding area is not predicted to decline as a result of the proposal.

As discussed in section 2.3.1, it is recognised that the proposal would change existing turning movements and travel times for some vehicles as a result of the introduction of the median. However, as noted in section 2.3.1, construction of the median is required in order to improve road safety within the corridor by physically separating eastbound and westbound traffic. Alternative access routes are described in section 2.3.1 and further detail regarding potential access impacts is provided in section 6.2.2 of the REF.

2.7 Cumulative impacts

2.7.1 Cumulative traffic impacts

Submission number

8, 13

Comment summary

- There will be an increase in heavy vehicle traffic as a result of construction of the North West Rail Link. This will be experienced until at least 2019
- Potential for cumulative traffic impacts as a result of the combination of construction traffic generated by the proposal and that generated by construction of the North West Rail Link. Showground Road is a nominated construction traffic route for the North West Rail Link. Construction of the proposal should avoid disrupting through traffic and construction traffic (generated by the proposal) should not travel through the Castle Hill centre.

Response

As discussed in section 6.16 of the REF, a number of projects are likely to be constructed at the same time as the proposal. This includes the North West Rail Link, which involves construction of two stations in the study area. Potential cumulative impacts may occur as a result of construction activities happening simultaneously, including increased traffic along Showground Road and the surrounding road network and associated delays for road users.

Cumulative impacts would be minimised through the application of project specific environmental safeguards and management measures as provided in sections 6.1, 6.2 and 7.2 of the REF, including the preparation and implementation of a traffic management plan.

The traffic management plan would be prepared in accordance with *Traffic Control at Work Sites* (RTA, 2010) and *Specification G10 - Control of Traffic* to minimise any potential impacts on road network operations during construction.

As noted in Table 6.43 (section 6.16.2) of the REF, the traffic management plan would be prepared in consultation with the Transport Management Centre and The Hills Shire Council to minimise potential cumulative impacts on traffic and access. Consultation would be carried out with North West Rail Link representatives.

Any additional mitigation measures identified during the consultation would be included in the traffic management plan that would be prepared prior to construction starting.

3. Environmental management

The REF for the Showground Road upgrade project identified the framework for environmental management, including management and mitigation measures that would be adopted to avoid or reduce environmental impacts (section 7 of the REF).

After consideration of the concerns raised in the submissions, the management and mitigation measures have been revised and some additions have been made.

Should the proposal proceed, environmental management will be guided by the framework and measures outlined.

3.1 Environmental management plans (or system)

A number of safeguards and management measures have been identified to minimise adverse environmental impacts, including social impacts, which could potentially arise because of the proposal. Should the proposal proceed, these management measures would be included in the detailed design and applied during the construction and operation of the proposal.

A Project Environmental Management Plan (PEMP) and a Contractor's Environmental Management Plan (CEMP) would be prepared to describe safeguards and management measures identified. These plans would provide a framework for establishing how these measures will be implemented and who would be responsible for their implementation.

The plans would be prepared prior to construction of the proposal and must be reviewed and certified by Roads and Maritime Sydney Region environment staff before the start of any on-site works. The CEMP would be a working document, subject to ongoing change and updated as necessary to respond to specific requirements. The CEMP and PEMP would be developed in accordance with the specifications set out in the Roads and Maritime QA Specification G36 – Environmental Protection (Management System), QA Specification G38 – Soil and Water Management (Soil and Water Plan) and the QA Specification G40 – Clearing and Grubbing.

3.2 Summary of safeguards and management measures

Environmental safeguards outlined in this document would be included in the detailed design phase of the proposal and during construction and operation of the proposal, should it proceed. These safeguards would minimise any potential adverse impacts arising from the proposed works on the surrounding environment. The safeguards and management measures are summarised in Table 3.1. Changes and additions made to those previously outlined in the REF are recorded in **blue and bold**.

Table 3.1 Summary of site specific environmental safeguards

No.	Impact	Environmental safeguards	Responsibility	Timing
1	**General**	**All environmental safeguards must be incorporated within the following documents:** • **Project Environmental Management Plan** • **Detailed design** • **Contract specifications for the proposal** • **Contractor's Environmental Management Plan.**	**Project manager**	**Pre-construction**
2	**General**	**All businesses and residences likely to be affected by the proposed works must be notified at least five working days before the start of the proposed activities.**	**Project manager**	**Pre-construction**
3	**General**	**Environmental awareness training must be provided, by the contractor, to all field personnel and subcontractors.**	**Contractor**	**Pre-construction and during construction as required**
4	**General**	**The following consultation activities will be undertaken as required:** • **Meetings with The Hills Shire Council and other relevant stakeholders, including government agencies, utility providers, bus operators, adjacent landowners and community stakeholders.** • **Providing project updates to the community during the construction planning phase and construction period.**	**Project manager**	**Detailed design**
Traffic and access				
5	Access to properties	Residents and businesses would be notified of any specific impacts to property access and arrangements required during construction during detailed design.	Roads and Maritime	Detailed design
6	Traffic	A detailed traffic management plan would be prepared in accordance with *Traffic Control at Work Sites* (RTA, 2010) and Specification G10 – *Control of Traffic.* The plan would be approved by Roads and Maritime before implementation to provide a comprehensive and objective approach to minimise any potential impacts on road network operations during construction.	Construction contractor	Pre-construction

No.	Impact	Environmental safeguards	Responsibility	Timing
7		The traffic management plan would include measures such as: • Safe access points to work areas from the adjacent road network • Safety barriers where necessary • Temporary speed restrictions when necessary • Maintaining adequate sight distance • Displaying prominent warning signage • Minimise the use of local roads by construction vehicles. The plan would be reviewed when complaints are received.	Construction contractor	Pre-construction
8		Consultation would be undertaken with local bus operators before and during construction.	Roads and Maritime	Pre-construction and construction
9		The community would be kept informed about construction through notifications and by prominently placed advisory notices or variable message signs.	Roads and Maritime	Pre-construction and construction
10	Congestion and safety	Traffic control would be provided to manage and regulate movements during construction.	Construction contractor	Construction
11	Access to properties	Property access would be maintained at all times where practicable.	Construction contractor and Roads and Maritime	Construction
12		Where changes to access arrangements are necessary, Roads and Maritime would advise owners and tenants and consult with them in advance regarding alternate access arrangements.	Construction contractor and Roads and Maritime	Construction
Noise and vibration				
13	Operational noise	Final noise mitigation treatments would be determined during the detailed design phase.	Roads and Maritime	Detailed design

No.	Impact	Environmental safeguards	Responsibility	Timing
14	Construction noise and vibration	A construction noise and vibration management plan would be prepared as part of the construction environmental management plan. This plan would include, but not be limited to: • A map indicating the locations of sensitive receivers including residential properties • Management measures to minimise the potential noise impacts from the quantitative noise assessment and for potential works outside of standard working hours (including implementation of *Interim Construction Noise Guidelin*es (DECC, 2009) • A risk assessment to determine potential risk for activities likely to affect receivers (for activities undertaken during and outside of standard working hours) • Mitigation measures to avoid noise and vibration impacts during construction activities including those associated with truck movements • A process for assessing the performance of the implemented mitigation measures • A process for documenting and resolving issues and complaints • A construction staging program incorporating a program of noise and vibration monitoring for sensitive receivers • A process for updating the plan when activities affecting construction noise and vibration change • Identify in toolbox talks where noise and vibration management is required.	Construction contractor	Pre-construction and construction
15	Vibration impacts on buildings	An assessment to determine safe working distances would be prepared for the following heritage properties: • 30 Showground Road • 74 Showground Road • 107 Showground Road. Vibration monitoring plan would be prepared and implemented during construction to ensure that these properties are not impacted.	Construction contractor	Pre-construction and construction
16	Vibration impacts		Roads and Maritime	Detailed design

No.	Impact	Environmental safeguards	Responsibility	Timing
17	Construction noise	Where reasonable and feasible, measures would be taken to shield residential receivers from noise such as: • The layout of the construction compound so that primary noise sources are at a maximum distance from residences, with solid structures (sheds, containers, etc) placed between residences and noise sources (and as close to the noise sources as is practical) • Enclosures to shield fixed noise sources such as pumps, compressors, fans, screens (where practicable) • Taking advantage of site topography when situating plant.	Construction contractor	Construction
18	Construction noise and vibration	Work generating high noise and/or vibration levels would be scheduled during less sensitive time periods if practicable.	Construction contractor	Construction
19	Out of hours work	General construction activities would be limited to the recommended construction hours where feasible and reasonable. If work is planned outside normal hours, an 'out of hours work procedure' would be prepared as part of the construction noise and vibration management plan for the proposal in accordance with the requirements of the *Interim Construction Noise Guideline* (DECC, 2009) and the *Environmental Noise Management Manual Practice* (RTA, 2001a). The out of hours procedure would as a minimum include: • Background levels for noise criteria in accordance with the *Interim Construction Noise Guideline* (DECC, 2009) • Locations of the works • Locations of sensitive receivers • Predicted noise levels • Communications plan. Management measures where works are unable to comply with *Interim Construction Noise Guideline* (DECC, 2009) and the *Environmental Noise Management Manual Practice* (RTA, 2001a).	Construction contractor	Construction
20	Construction noise from machinery and equipment	All plant and equipment would be appropriately maintained to ensure optimum running conditions, with periodic monitoring.		Construction
21		Noise-emitting plant would be directed away from sensitive receivers where possible.	Construction contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
22		Traffic flow, parking and loading and unloading areas would be planned to minimise reversing movements within the proposal site.	Construction contractor	Construction
23		Non-tonal reversing beepers (or an equivalent mechanism) would be fitted and used on all construction vehicles and mobile plant regularly used on-site for periods more than two months where practicable.	Construction contractor	Construction
24	Construction noise from inappropriate practices	Site inductions would be provided to train staff on ways to minimise construction noise impacts on-site. Responsible working practices include: • Avoid the use of outdoor radios at night • Avoid shouting and slamming of doors • Where practical, operate machines at low speed or power and switch off when not being used rather than left idling for prolonged periods • Minimise reversing • Avoid dropping materials from height and avoid metal to metal contact on material.		Construction
25		The local community would be contacted and informed of the proposed work, location, duration of work, and hours involved at least five days before work starts.	Construction contractor and Roads and Maritime	Pre-construction and construction
26		A complaints management procedure would be put in place, with a mechanism for responding to complaints.	Construction contractor	Construction
27		Construction noise monitoring would be undertaken and where necessary, further noise reduction measures (where reasonable and feasible) would be implemented.	Construction contractor	Construction
28		Noise and vibration generating activities with impulsive, tonal or low frequency characteristics (such as jack hammering, rock breaking, rock hammering, vibratory rolling) would be carried out: • In continuous blocks, up to but not exceeding three hours each • With a minimum respite period of one hour between each block.		Construction
29		Quieter and less noise/vibration emitting construction methods would be used where feasible and reasonable.		Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
30		Where vibration intensive equipment is used within the minimum working distances identified, determine whether alternative construction methodology or less vibration intensive equipment can be used.		Construction
31		Where construction activity involving vibration intensive plant occurs within the minimum working distances defined in Table 6.10 of the REF for cosmetic damage to buildings, and in Table 6.18 of the REF for heritage items, vibration testing of actual equipment on-site would be carried out before construction starts to determine acceptable buffer distances to the nearest affected receiver locations **and appropriate management measures.**		Pre-construction construction
32		To ensure that vibration does not impact on heritage buildings, vibration monitoring would be undertaken where construction is undertaken at or within the distances defined in Table 6.18 of the REF.		Construction
33		Where vibration is found to be excessive, construction methods would be modified or time restrictions negotiated with affected receivers.		Pre-construction construction
34	Operational noise	A noise monitoring program would be carried out within 12 months of opening once traffic flows have stabilised to verify the predicted noise levels. Monitoring locations would be selected along the route at the most affected residential receiver locations.	Roads and Maritime	Operation
Soils, landscape, topography and soils				
35		A soil and water management plan (SWMP) will be prepared as part of the construction environmental management plan in accordance with the requirements of Roads and Maritime Services contract specification G38 prior to the commencement of construction. The SWMP will also address the following: • Roads and Maritime Services' Code of Practice for Water Management, the Roads and Maritime Services' *Erosion and Sedimentation Procedure* • The NSW *Soils and Construction – Managing Urban Stormwater Volume 1* "the Blue Book" (Landcom, 2004) and Volume 2 (DECC, 2008) • Roads and Maritime Services' Technical Guideline: *Temporary Stormwater Drainage for Road Construction, 2011* • Roads and Maritime Services' Technical Guideline: *Environmental Management of Construction Site Dewatering, 2011*.	Construction contractor	Pre-construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		The SWMP would detail the following as a minimum: • Identification of catchment and sub-catchment areas, high risk areas and sensitive areas • Sizing of each of the above areas and catchment • The likely volume of run-off from each road sub-catchment • Direction of flow of on-site and off-site water • Separation of on-site and off-site water • The direction of run-off and drainage points during each stage of construction • The locations and sizing of sediment traps such as sump or basin as well as associated drainage • Dewatering plan which includes process for monitoring, flocculating and dewatering water from site (ie sediment basin and sumps) • A mapped plan identifying the above • Include progressive site specific Erosion and Sedimentation Control Plans (ESCPs). The ESCP is to be updated at least fortnightly • A process to routinely monitor the BOM weather forecast • Preparation of a wet weather (rain event) plan which includes a process for monitoring potential wet weather and identification of controls to be implemented in the event of wet weather. These controls are to be shown on the ESCPs • Provision of an inspection and maintenance schedule for ongoing maintenance of temporary and permanent erosion and sedimentation controls.		
36	Contamination of soil	An incident emergency spill plan would be developed and incorporated into the construction environmental management plan. The plan would include measures to avoid and manage spillages of fuels, chemicals, and fluids onto any surfaces or into stormwater inlets and an emergency response procedure.	Construction contractor	Pre-construction
37	Erosion and sedimentation	Erosion and sediment controls would be implemented before any construction starts and inspected regularly, particularly after a rainfall event. Maintenance work would be undertaken as needed.	Construction contractor	Construction
38		Site stabilisation of disturbed areas would be undertaken progressively as stages are completed.	Construction contractor	Construction
39		All stockpiles would be designed, established, operated and decommissioned in accordance with Roads and Maritime Services' *Stockpile Management* Procedures (RTA, 2011).	Construction contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
40		Controls would be implemented at exit points to minimise the tracking of soil and particulates onto pavement surfaces.	Construction contractor	Construction
41		Any material transported onto pavement surfaces would be swept and removed at the end of each working day.	Construction contractor	Construction
42	Excess spoil	Excess spoil not required or able to be used for backfilling would be stockpiled in a suitable location before being reused or removed from the site, and disposed of at an appropriately licensed facility.	Construction contractor	Construction
43	Contamination of soils	In the event that indicators of contamination are encountered during construction (such as odours or visually contaminated materials), work in the area would cease until advice on the need for remediation or other action is obtained from an environmental consultant.	Construction contractor	Construction
44		All staff would be inducted about incident and emergency procedures and made aware of the location of emergency spill kits.	Construction contractor	Construction
45		Should a spill occur during construction, the emergency response plan would be implemented, and the Roads and Maritime's Environment Officer, Sydney Region contacted. The NSW Environment Protection Authority would also be notified as per Part 5.7 of the POEO Act.	Construction contractor	Construction
46		Machinery would be checked daily to ensure there is no oil, fuel or other liquid leaking from the machinery.	Construction contractor	Construction
47		A fully equipped emergency spill kit would be kept on-site at all times.	Construction contractor	Construction
Hydrology, water quality, flooding and drainage				
48	Drainage design	Consultation with The Hills Shire Council would be undertaken during detailed design to ensure appropriate integration with council's stormwater network.	Roads and Maritime	Detailed design
49	Drainage design	The potential for an overland increase in peak flows in Catchment 2D would be considered during detail design.	Roads and Maritime	Detailed design
50	Sedimentation and contamination of surface water	Erosion, sedimentation and contamination measures identified in Table 6.23 of the REF would be implemented.	Roads and Maritime and construction contractor	Pre-construction and construction

No.	Impact	Environmental safeguards	Responsibility	Timing
51	Contamination of surface water	All fuels, chemicals, and liquids would be stored at least 50 metres away from any waterway or drainage line and would be stored in an impervious bunded area within the compound site.		Construction
52		The refuelling of plant and maintenance of machinery would be undertaken in impervious bunded areas in the designated compound area.		Construction
53		Vehicle wash downs and/or concrete truck washouts would be undertaken within a designated bunded area of an impervious surface or undertaken off-site.	Construction contractor	Construction
54	Dewatering	Low lying areas of construction formations and excavations that collect stormwater would be dewatered in accordance with the Roads and Maritime Services' *Technical Guideline for Dewatering*.	Construction contractor	Construction
Biodiversity				
55	Direct impacts to native vegetation	Where possible, minimise the clearing of mature street trees, in particular remnant and regenerating Blue Gum trees, hollow-bearing and habitat trees shown on Figure 6.15 of the REF during the design of the pathways and stormwater pipes.	Roads and Maritime	Detailed design
56	Potential for impact to native fauna that may occur within the proposal site and habitat features to be retained	A biodiversity management plan would be prepared as part of the construction environmental management plan. The biodiversity management plan would include (but not be limited to) the following: • A site walk with qualified site personnel including Roads and Maritime representatives to confirm clearing boundaries and sensitive location (ie prior to commencement of works • Identification (marking) of the clearing boundary and identification (marking) of habitat features to be protected. Eg use of flagging tape • A map which clearly shows vegetation clearing boundaries and sensitive areas/no go zones • Incorporation of management measures identified as a result of the pre-clearing survey report (G40, section 2.4) and nomination of actions to respond to the recommendations made. This would include details of measures to be implemented to protect clearing limits and no go areas • A detailed clearing process in accordance with Roads and Maritime Services' *Biodiversity Guidelines 2011* including requirements of Guide 1,2, 4 & 9 • Identify in toolbox talks where biodiversity would be included such as vegetation clearing or works in or adjacent to sensitive locations • Identify control/mitigations measures to prevent impacts on sensitive locations or no go zones	Construction contractor	Pre-construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		• A stop works procedure in the event of identification of unidentified species, habitats or populations.		
57	Potential for spread of exotic or invasive species, or spread of pathogens that may be harmful to native biota.	A weed management plan would be prepared in accordance with Roads and Maritime Services' *Biodiversity Guidelines 2011* and incorporated into the biodiversity management plan and would address: • Identification of the weeds on-site (confirm during ecologist pre-clearing inspection) • Weed management priorities and objectives • Sensitive environmental areas within or adjacent to the site • Location of weed infested areas • Weed control methods • Measures to prevent the spread of weeds, including machinery hygiene procedures and disposal requirements • A monitoring program to measure the success of weed management • Communication with the local council's noxious weed representative.	Construction contractor	Pre-construction
58	Potential for direct impacts on native fauna species	Immediately prior to the commencement of clearing each day, a suitably qualified ecologist would check the area that would be cleared that day for any resident fauna, and if any is found, a suitably qualified wildlife handler or ecologist would relocate that fauna into suitable habitat nearby. If no habitat is present or there is concern over impacts of a day-time release of a nocturnal species, the animal would be released into the care of WIRES. Any unexpected threatened species finds would be dealt with in accordance with the *Biodiversity Guidelines 2011* (RTA, 2011).	Construction contractor	Construction
59	Direct impacts to native vegetation	Any ripe seed would be collected from mature Blue Gums (*Eucalyptus saligna*) and Turpentine (*Syncarpia glomulifera*) during pre-clearing and provided to a local council nursery or similar for propagation and use in local rehabilitation areas. Following completion of construction, impacted areas would be re-vegetated, where practicable, with local endemic species, representative of adjoining native vegetation and appropriate to the final landform of the site.	Construction contractor	Construction
Aboriginal cultural heritage				
60	Aboriginal heritage item encountered during work	In the event of an unexpected find of an Aboriginal heritage item (or suspected item), work would cease in the affected area and Roads and Maritime's Environment Officer, Sydney Region and the Roads and Maritime Aboriginal Cultural Heritage Officer, would be contacted for advice on how to proceed. The Roads and Maritime Services' *Unexpected Archaeological Finds Procedure 2012* would be followed in the event a potential artefact is uncovered.	Construction contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
Non-Aboriginal heritage				
61	House 30-34 Showground Road	The proposed retaining wall along the property boundary would be as unobtrusive as possible. The design, colour and construction of the wall would aim to minimise impacts on the views and setting of the heritage item.	Roads and Maritime	Detailed design
62	Direct impacts on heritage items	If the final design of the proposal changes considerably from that currently proposed, additional assessment may be required.	Roads and Maritime	Detailed design
63	House 30-34 Showground Road	Photographic archival recording would be undertaken to document the timber and wire fence and its relationship to the house. The fence would be surveyed so that the position and layout are recorded.		Pre-construction
64	Vibration impacts on heritage items	A construction noise and vibration management plan would be prepared as part of the construction environmental management plan to determine what construction methods would be used in the vicinity of heritage listed items. This would include measures to minimise the likelihood of vibration impacts.	Construction Contractor	Pre-construction
65		Vibration management measures provided in section 6.3.4 of the REF would be implemented to minimise structural vibration impacts to heritage items.	Construction Contractor	Pre-construction
66	Inadvertent impacts on heritage items	A heritage induction would be provided to all workers before construction begins informing them of the location of heritage items within the study area, and guidelines to follow if unanticipated heritage items or deposits are located during construction.		Construction
67	Unanticipated archaeological finds	If any unanticipated archaeological deposits are identified within the study area during construction the Roads and Maritime Services' *Unexpected Archaeological Finds Procedure 2012* would be followed.		Construction
Landscape character and visual impacts				
68	Light spill	Lighting would be designed to minimise light spill into residential properties and sensitive receptors.	Roads and Maritime	Detailed design
69	Visual impacts	Permanent signage would be located in a manner that does not impede views to identified landmarks and heritage properties.	Roads and Maritime	Detailed design

No.	Impact	Environmental safeguards	Responsibility	Timing
70		Detailed design would consider use of a different pavement treatment to the part of the footpath and shared path which extends east beyond the Cheriton Avenue and Kentwell Avenue intersection (identified as a future transition point). A more elaborate use of colours and textures, or the incorporation of a higher quality finish would emphasise the transition into a more urban environment and would mark the approach to the commercial centre.	Roads and Maritime	Detailed design
71		The quality of finishes and treatments that can be viably maintained over time would be considered during detailed design.	Roads and Maritime	Detailed design
72		Where the shared path crosses driveways, consideration would be given to use treatment (materials or colours) to provide a visual cue to remind cyclists to look out for cars.	Roads and Maritime	Detailed design
73		Construction equipment, stockpiles, and other visible elements would be located away from key views to and from the identified visual receptors where feasible. Where this is not feasible, screening measures and practices to keep sites tidy would be implemented.	Construction contractor	Construction
74	Light spill	Temporary lighting would be sited and designed to avoid light spill into residential properties and identified sensitive receptors.	Construction contractor	Construction
75		Where visually important vegetation is removed, revegetation would occur where it is safe and practicable to do so. Locations would include remaining road verges, such as the front of 101-119 Showground Road.	Construction contractor	Operation
76		New plantings would incorporate locally occurring species which reflect the landscape character zone (generally transitioning from a greater variety and informal compositions through the residential areas, to more formal and less diverse plantings through the approach to the commercial centre and around commercial uses).	Construction contractor	Operation
77	Safety	**New plantings along the shared path or footpath would be selected and positioned so** • **They do not present safety hazards and reduce casual surveillance from the road and adjoining properties** • **They provide for a minimum clearance height to meet Roads and Maritime standards.**	Construction contractor	Operation

No.	Impact	Environmental safeguards	Responsibility	Timing
Air quality				
78	General air quality impacts	An air quality management plan would be prepared as part of the construction environmental management plan. The plan would include but not be limited to: • A map identifying locations of sensitive receivers • Identification of potential risks/impacts due to the work/activities as dust generation activities • Management measures to minimise risk including a progressive stabilisation plan • A process for monitoring dust on-site and weather conditions • A process for altering management measures as required.	Construction contractor	Pre-construction
79	Dust emissions	Dust suppression measures would be implemented as per the air quality management plan.	Construction contractor	Construction
80		Stockpiled materials would be covered, stabilised or stored in areas not subject to high wind.	Construction contractor	Construction
81		All trucks would be covered when transporting material to and from the site.	Construction contractor	Construction
82		Work activities would be reprogrammed if the mitigation measures are not adequately restricting dust generation.	Construction contractor	Construction
83	Exhaust emissions	Construction plant and equipment would be maintained in a good working condition in order to limit impacts on air quality.	Construction contractor	Construction
84		Plant and machinery would be turned off when not in use.	Construction contractor	Construction
85	Impacts on sensitive receivers	Local residents would be advised of hours of operation and duration of work and supplied with a contact name and number for queries regarding air quality.	Construction contractor	Construction
Land use and property				
No additional specific safeguards or management measures are required.				

No.	Impact	Environmental safeguards	Responsibility	Timing
Socio-economic				
86	Construction impacts on the community	A complaints handling procedure and register would be included in the construction environment management plan.	Construction contractor	Pre-construction
87		Local residents and potentially affected businesses would be notified before work starts and would be kept regularly informed of construction activities during the construction process.		Pre-construction and Construction
88		A communication plan would be prepared and included in the construction environmental management plan. The communication plan would include (as a minimum): • Requirements to provide details and timing of proposed activities to affected residents • Contact name and number for complaints • Procedure to notify adjacent land users for changed conditions during the construction period such as traffic, pedestrian or driveway access. The communications plan would be prepared in accordance with G36 requirements and Roads and Maritime Services' *Community Engagement and Communications Manual 2012c.*	Construction contractor	Pre-construction
89	Construction impacts on road users	During construction, road users, pedestrians and cyclists would be informed of any changed conditions.	Construction contractor	Construction
90	Construction impacts on utilities and services	Residents and businesses would be informed before any interruptions to utility services that may be experienced as a result of utilities relocation.	Construction contractor	Construction
Resource use and waste management				
91	Demand on resources	Procurement would endeavour to use materials and products with a recycled content where that material or product is cost and performance effective.	Construction contractor	Pre-construction and construction

No.	Impact	Environmental safeguards	Responsibility	Timing
92	Waste management	A resource and waste management plan would be prepared and included in the construction environmental management plan. The plan would include the following (as a minimum): • The type, classification and volume of all materials to be generated and used on-site including identification of recyclable and non-recyclable waste in accordance with *Waste Classification Guidelines.* • Quantity and classification of excavated material generated as a result of the proposal (refer Roads and Maritime Services' W*aste Management Fact Sheets 1-6, 2012*) • Interface strategies for cut and fill on-site to ensure re-use where possible • Strategies to 'avoid', 'reduce', 'reuse' and 'recycle' materials • Classification and disposal strategies for each type of material • Destinations for each resource/waste type either for on-site reuse or recycling, offsite reuse or recycling, or disposal at a licensed waste facility • Details of how material would be stored and treated on-site • Identification of available recycling facilities on and off-site • Identification of suitable methods and routes to transport waste • Procedures and disposal arrangements for unsuitable excavated material or contaminated material including asbestos waste • Site clean-up for each construction stage.	Construction contractor	Pre-construction
93	Demand on resources	Excavated material would be reused on-site for fill where feasible to reduce demand on resources.	Construction contractor	Construction
94		Any additional fill material required would be sourced from appropriately licensed facilities and/or other Roads and Maritime projects.	Construction contractor and Roads and Maritime	Construction
95	Waste minimisation	The following resource management hierarchy principles would be followed: • Avoid unnecessary resource consumption as a priority • Avoidance would be followed by resource recovery (including reuse of materials, reprocessing, and recycling and energy recovery) • Disposal would be undertaken as a last resort (in accordance with the *Waste Avoidance and Resource Recovery Act 2001*).	Construction contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
96	Management of green waste	Cleared weed-free vegetation would be chipped and reused on-site as part of the proposed landscaping and to stabilise disturbed soils where possible.	Construction contractor	Construction
97	Spoil management	Excess excavated material would be disposed of at an appropriate facility or reused appropriately for fill on the proposal site.	Construction contractor	Construction
98		Excess soil requiring waste disposal would first be assessed against the *Waste Classification Guidelines- Part 1: Classifying Waste* (DECCW, 2009). Soil samples would be taken from stockpiled material and analysed. Transportation would be undertaken by a licensed contractor capable of transporting the waste and waste would be disposed of to an appropriately licensed waste facility with supporting waste classification documentation.	Construction contractor	Construction
99	Waste management	Garbage receptacles would be provided and recycling of materials encouraged. Rubbish would be transported to an appropriate waste disposal facility.	Construction contractor	Construction
100		All wastes would be managed in accordance with the *Protection of the Environment Operations Act 1997* .	Construction contractor	Construction
101		Portable toilets would be provided for construction workers and would be managed by the service provider to ensure the appropriate disposal of sewage.	Construction contractor	Construction
102		Noxious weeds removed during work would be managed in accordance with the Department of Primary Industries' requirements that relate to its classification status.	Construction contractor	Construction
103		Site inductions would occur and be recorded by a Site Supervisor to ensure staff are aware of waste disposal protocols.	Construction contractor	Construction
104	Wastewater contamination of soils and water	A dedicated concrete washout facility would be provided during construction so that run-off from the washing of concrete machinery and equipment can be collected and disposed of at an appropriate waste facility.	Construction contractor	Construction
Hazards and risks				
105	Risk Management	Emergency response plans would be incorporated into the construction environmental management plan including a flood evacuation plan.	Construction contractor	Pre-construction and construction
106		A pollution incident response management plan would be developed and implemented in accordance with the *Protection of the Environment Operations Act 1997* requirements. The plan would form a sub-plan within the construction environmental management plan.	Construction contractor	Pre-construction and construction

No.	Impact	Environmental safeguards	Responsibility	Timing
Climate change and greenhouse gases				
107	Climate change impacts on the proposal	Detailed design would take into consideration the potential effect of climate change on the proposal, including flooding and drainage requirements in accordance with Roads and Maritime Services Climate Change Plan.	Roads and Maritime	Pre-construction
108	Greenhouse gas emissions	The use of alternative fuels and power sources for construction plant and equipment would be investigated and implemented, where appropriate.	Construction contractor	Pre-construction
109		The energy efficiency and related carbon emissions would be considered in the selection of vehicle and plant equipment.	Construction contractor	Pre-construction
110	Greenhouse gas emissions	Materials would be delivered as full loads and local suppliers would be used where possible.	Construction contractor	Construction
111		Construction equipment, plant and vehicles would be appropriately sized for the task.	Construction contractor	Construction
112		Equipment would be serviced frequently to ensure they are operating efficiently.	Construction contractor	Construction
113		Vehicles and machinery would not be left idling when not in use.	Construction contractor	Construction
114		Clearing of vegetation would be minimised where possible.	Construction contractor	Construction
Cumulative impacts				
115	Cumulative impacts	Ongoing coordination and consultation would be undertaken with North West Rail Link and QIC to ensure cumulative noise and traffic impacts are appropriately assessed and managed.	Roads and Maritime and construction contractor	Detailed design and construction
116	Cumulative impacts	The construction environmental management plan would be revised to consider potential cumulative impacts from surrounding development activities as they become known.	Construction contractor	Pre-construction
117	Cumulative traffic and access impacts	The traffic management plan would be prepared in consultation with the Transport Management Centre and The Hills Shire Council to minimise potential cumulative impacts on traffic and access.	Roads and Maritime and construction contractor	Pre-construction

No.	Impact	Environmental safeguards	Responsibility	Timing
118	Night work	An ‘out of hours work procedure’ would be prepared as part of the construction noise and vibration management plan for the proposal in accordance with the requirements of the *Interim Construction Noise Guideline* (DECC, 2009) and the Roads and Maritime Services’ *Environmental Noise Management Manual Practice* (RTA, 2001a) and would consider the cumulative impact from other construction activities occurring in the vicinity of the proposal.	Construction contractor	Construction

3.3 Licensing and approvals

No additional licences or approvals are required for the proposal.

4. References

GHD 2014, *Showground Road upgrade: Carrington Road to Old Northern Road, Castle Hill, Review of Environmental Factors,* Sydney.

GHD

133 Castlereagh St Sydney NSW 2000
-
T: +61 2 9239 7100 F: +61 2 9239 7199 E: sydmail@ghd.com.au

G:\21\22830\WP\199389.docx

Document Status

Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
A	R. Exikanas	A. Raleigh		A. Raleigh		2.06.14
0	R. Exikanas	A. Raleigh		A. Raleigh		20.06.14
1	R. Exikanas	A. Raleigh		A. Raleigh		25.06.14
2	R. Exikanas	A. Raleigh		A. Raleigh		25.07.14

www.ghd.com